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Johnson Grass as a Weed in Southwestern Iowa

L. H. Pammel
Iowa State College

C. M. King
Iowa State College

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Abstract
On October 5, 1912, C. F. Curtiss received from N. S. Ward of Hamburg, Iowa, a specimen of Johnson grass with the following letter: "Please send me names and value, If any, of sample weed. It grows up in my corn field after corn is laid by, as high as corn. Has heads 8 to 10 inches long. Seems to be getting worse each year. Neighbors say it's Johnson grass. Would It be good for bay or pasture?" The specimen sent was a specimen of Johnson grass. Mr. Ward was notified that the weed should be exterminated, as It might prove a very serious menace to the agricultural Interests In that section of the state.

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Johnson Grass as a Weed in Southwestern Iowa

By L. H. Pammel and C. M. King.

On October 5, 1912, C. F. Curtiss received from N. S. Ward of Hamburg, Iowa, a specimen of Johnson grass with the following letter: "Please send me names and value, if any, of sample weed. It grows up in my corn field after corn is laid by, as high as corn. Has heads 8 to 10 inches long. Seems to be getting worse each year. Neighbors say it's Johnson grass. Would it be good for hay or pasture?" The specimen sent was a specimen of Johnson grass. Mr. Ward was notified that the weed should be exterminated, as it might prove a very serious menace to the agricultural interests in that section of the state.

On July 4, 1914[1], one of us visited Hamburg and found a considerable quantity of the weed in one of the vacant lots. The weed was thoroly naturalized.

Quite recently (1918) one of us, upon a visit to Hamburg, found the same patch of Johnson grass, thoroly naturalized and spreading. The area of the patch was somewhat extended and the plants had an abundance of mature seed. F. L. Overly, county agent of Fremont county, informs us that it occurs at a number of other points in the county.

The fact that Johnson grass has persisted in this region as a perennial since 1912, during the very severe winter of 1916-17, when much of the alfalfa of the region was killed and winter wheat suffered severely, is significant. It is certain, therefore, that Johnson grass has become established and there is every possibility that it will be as great a menace to farmers of southern Iowa as quack grass is to the farmers of northern Iowa. It is well known that Johnson grass is the greatest menace to the farmers of the south. It was considered so important as a weed that W. J. Spillman and J. S. Cates [2] [3] carried on some extensive investigations on the best methods to eradicate the weed. Since it has become established in Fremont county, there is no reason why it will not do so in Mills and other counties as far north as Council Bluffs and in Taylor, Page and other counties along the southern border of Iowa.

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[1] A second specimen collected at Hamburg, Iowa, July 4, 1914, by L. H. Pammel and H. B. Clark.

[2] W. J. Spillman, Extermination of Johnson Grass, Bull. Bur. Pl. Industry, 72, Pt. III, 1-14, pl. 1-3.

[3] J. T. Cates and W. J. Spillman, A Method of Eradicating Johnson Grass, Farmers Bull. 279; 1-16, f. 1-8.

Fig. 1. Flowering and fruity heads of Johnson Grass.

Johnson grass is a perennial propagated freely by the underground rootstocks, commonly called roots. Cates and Spillman have found that there are three kinds of rootstocks. The primary constitute all of the rootstocks alive in the ground at the beginning of the growing season. The secondary come to the surface and arise from the primary; these form crowns and give rise to the stalks above ground. The third or tertiary start when the plant is in bloom. These rootstocks become large and sometimes extend to a depth of four feet. The secondary and tertiary rootstocks live over.

BOTANICAL DESCRIPTION

Johnson grass is smooth and erect, with small stems, 3 to 5 feet high, leaves elongated 1-4 to 3-4 inches wide with ciliate ligule, and where the leafblade joins the sheath it is more or less pubescent. Panicle large and open, 6 to 12 inches long, with whorled branches; the upper part of the panicle forms a loose clustered pedicel, staminate spikelets with stout hairs. Sessile spikelet broadly lanceolate, acute, 2 to 3 lines long, pale green or violet, becoming black or nearly black at maturity. This contains the fruit. Lower scale colorless and sparingly hairy on the back, 5 to 7 nerved. Second scale smaller and equalling the first, convex below, subcarinate above, acute, the hyaline inflexed margins ciliate. The third scale a little shorter than the lower ones, faintly two-nerved with unfolded margins ciliate. Fourth scale broadly oval, obtuse, much shorter than the second, two-lobed at the apex and ciliate, awned. Palea a little shorter than the other scales with no nerves and ciliate.

JOHNSON GRASS SEED AS AN IMPURITY IN COMMERCIAL SEED

Large amounts of sweet clover are sold in the state of Iowa. Some seed comes from Kansas, Nebraska and Oklahoma. We have found that this seed frequently contains Johnson grass. Hence it is important that farmers be on their guard to avoid introducing this grass into their fields in this way.

Johnson grass closely resembles sudan grass, the latter being classed under Andropogon sorghum. Sudan grass is a valuable forage plant introduced from Africa, is annual in its habits, shooting readily upon being cut, but lacking the underground rootstocks, the presence of which makes Johnson grass a persistent weed. Mixtures in the field may be prevented by giving attention to the purity of the sudan grass seed sown. The seeds of the two grasses are somewhat difficult to distinguish from each other.

Fig. 2. a. A Rootstock of Johnson Grass with Secondary roots. b. Perennial Rootstock.

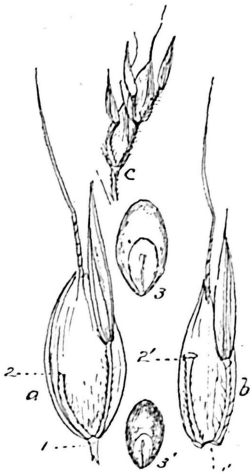

Fig. 3. A. Seed of Sudan Grass. 1. Fragment of pedicel; 2. Broken tip of pedicel; 3. Hulled grain.

B. 1. Suture at base; 2. Disk at tip of pedicel; 3. Hulled grain.

C. Johnson Grass showing arrangement of sessile and pedicellate spikelets.

The seed of the Johnson grass has a distinct suture at the base, seldom being found to bear a fragment of the stem; the two accompanying attached pedicels bear disks, making the suture at the union of the pedicel with secondary spikelet.

BOTANICAL SEED DESCRIPTION

The seed is described in Weed Flora of Iowa[4] as follows: "Sessile spikelet broadly lanceolate, acute, 4 to 6 mm. (about one-fourth inch) long, becoming dark purplish at maturity, callus small, obtuse, shortly and sparingly barbate; first glume coriaceous, slightly pubescent on the flattened back; 5 to 7 nerved; second similar, equal to first with hyaline, ciliate inflexed margins, the third glume shorter, membranous, faintly two-nerved, with ciliate infolded margins, fourth glume broad, obtuse, shorter than second, two-lobed at apex ciliate awned; awn 10 to 16 mm. (1-2 to 2-3 inch) long; palea shorter than glumes without nerves, ciliate."

The hulled grain is smaller and darker than in Sudan grass. The awns in both grasses are readily broken off in handling and cleaning. Sudan grass seed is somewhat larger and lighter colored. When shed, the seed retains a fragment of its stem or rachis, the attached pedicel being irregu-

[4]Pammel, L. H. Weed Flora of Iowa, Ia. Geol. Sur. Bull. 4:408.

larly broken off at the tips. The two seeds have been compared in a bulletin of the United States Department of Agriculture[5].

The history of Johnson grass in the United States is of interest. C. R. Ball [6] states that the grass was introduced from Turkey into South Carolina about 1830. Governor Means of that state sent a gentleman to instruct the Turks upon a method of growing cotton; this person brot back some of the grass which was later, (1840) taken by Col. William Johnson to sow on his plantation in the fertile bottomlands of the Alabama River, near Salem. Col. Johnson was the first man, therefore, to give this grass extensive cultivation, and hence it received the name, Johnson grass, altho in South Carolina it was known as Means' grass, after Governor Means, who was responsible for the introduction of the grass.

During the seventy years since its introduction, the grass has spread to all of the southern states and north to Missouri, Kansas, New Mexico, Arizona and California. It is an abundant and pernicious weed in Texas, Kansas, Arizona and California, as well as the Iowa locality. Altho Johnson grass came, originally, from a warm climate, it has adapted itself to a wide range of climatic conditions. We have shown that the plant matures its seed in Iowa.

Johnson grass is closely related to sorghum, and is considered a most valuable forage plant. Where forage grasses do not succeed well; it can be used to great advantage, but where alternate husbandry is followed it is a great evil. Its advent in Iowa, is, therefore, to be looked upon as an evil to the farming interests and every effort should be made to exterminate it at once.

HOW THE WEED IS SCATTERED

Mr. Ball states that the hard seed passes, unharmed, thru the digestive tract of animals, thus readily disseminating the plant. The cultivator and harrow are the means by which the weed is scattered in the field.

METHODS OF EXTERMINATION

The best method of exterminating the weed is to put the field into meadow or pasture and keep the same closely cropped. When it has been in pasture for a whole year, give it a shallow cultivation during the midsummer and keep the field clean until frost.

Cates and Spillman recommend as follows:

"If a cultivated field is overrun in large spots with the grass, it would be advisable to sow the whole field and level down in ridges. If the land is already in sod, cut the hay before blossoming every time a growth is thrown up, or, better, pasture it; then flatbreak; that is, plow it with an ordinary turning plow, just deep enough to turn up all the rootstocks, which will usually be three to four inches deep. Plant a cultivated crop and give this crop a little extra cultivation. Any stray shoots of grass that may be seen may be removed by hand about the time the grass heads out. This can be easily done, since the roots will be shallow."

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[5]Hillman, F. H. Distinguishing Characters of the Seeds of Sudan Grass and Johnson Grass, U. S. Dept. Agrl. Bull. 406:1-5.
[6]Bull. Bur. Pl. Industry, 11:1-24, Pl. 1, f. 1, 1902.